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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,633

Applicant(s)

COULSON, ALAN JAMES

Examiner

SIU M. LEE

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-49 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 30-33, 37-44 and 46-49 is/are rejected.
7) ☒ Claim(s) 34-36 and 45 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 23 September 2005 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3/14/2007
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 31, 33, 34-37-40, 42, 44, 46-47 are objected to because of the following informalities:

(1) Regarding claim 34:

Lines 2-3 recites "the step of detecting a pilot symbol"; it should be corrected to "the step of detecting **the** pilot symbol".

(2) Regarding claim 35:

Line 3 recites "the step of timeout if a pilot symbol is not detected"; it should be corrected to "the step of timeout if **the** pilot symbol is not detected".

(3) Regarding claim 36:

Line 2 recites "wherein when a timeout occurs"; it should be corrected to "wherein when the timeout occurs".

Line 4 recites "operating a pilot symbol detector"; it should be corrected to "operating the pilot symbol detector".

(4) Regarding claim 47:

Line 2 recites "to produce a timeout of a pilot symbol"; it should be corrected to "to produce a timeout of **the** pilot symbol".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

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2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 31, 31, 37-40, 42, 44, 46-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(1) Regarding claim 31:

Line 2 recites "wherein the number of taps in the adaptive filter"; there is no antecedent basis for "the number of taps".

Line 3 recites "is greater than the maximum number of interference to be cancelled"; there is no antecedent basis for "the maximum number".

Line 3 recites "the length of the pilot symbol"; there is no antecedent basis for "the length of the pilot symbol".

(2) Regarding claim 33:

Line 2 recites "wherein the length of the delay"; there is no antecedent basis for "the length of delay".

(3) Regarding claim 37:

Lines 10-11 recite "does not detect a pilot symbol in the filtered data without a predetermined number of operations"; the examiner suggests changing to "does not detect a pilot symbol in the filtered data within a predetermined number of operations".

Lines 12-13 recite "from the receiver path"; there is no antecedent basis for "the receiver path".

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Line 13-14 recites "within the predetermined number of second correlator operations"; since there is no antecedent basis for this limitation.

(4) Regarding claim 39:

Lines 2-3 recite "the number of taps in the adaptive filter"; there is no antecedent basis for "the number of taps".

Line 3 recites "the maximum number of interferers to be cancelled"; there is no antecedent basis for "the maximum number of interferers".

(5) Regarding claim 42:

Line 2 recites "the number of taps" and "the maximum number of interferers"; there is no antecedent basis for these two limitations.

(6) Regarding claim 44:

Claim 44, line 2 recites "the length of the delay in the delay stream of received signal is longer than the length of the pilot symbol"; there is no antecedent basis for "the length", "the delay", "the delay stream", and "the length of the pilot symbol".

(7) Regarding claim 46:

Line 2 recites "the sliding correlator"; there is no antecedent basis for this limitation.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to

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be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (US 6,904,079 B2) in view of Abdelmonem et al. (US 2002/0173341 A1) and Ninomiya et al. (US 2001/0033625 A1).

(1) Regarding claim 41:

Hoffmann et al. discloses a receiver comprising:

a correlator (access acquisition 60 in figure 3) arranged to detect pilot symbols in the data (the access acquisition function 60 is seen to include a pilot correlation filter 70 as well as an integration function 72, column 5, lines 58-67), and wherein the pilot symbol includes one or more repetitions of known data or pseudo noise sequence (each pilot block 53 consists of a number of repeated pilot symbol, column 5, lines 7-8).

Hoffmann et al. fails to disclose (a) a logic system arranged to reroute the received data to a receiving apparatus when a pilot symbol has been detected and (b) a front end arranged to receive data and an adaptive filter arranged to filter narrowband interference from the received data and provide filtered data.

With respect to (a), Ninomiya et al. discloses a logic system arranged to reroute the received data to a receiving apparatus when a pilot symbol has been detected (a pilot signal of a carrier wave is extracted and judged and based on a judgment of the pilot, either demodulation circuit 13 or 14 is being used for demodulation, abstract, figure 2, paragraph 0071).

It is desirable to reroute the received data to a receiving apparatus when a pilot symbol has been detected because multiple mode of the apparatus can be implemented under the decision of the pilot. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Ninomiya et al. in the receiver of Hoffman et al. to improve the functionality of the receiver.

With respect to (b), Abdelmonem et al. discloses a front end (antenna 10 and amplifier front-end 12 as shown in figure 3) arranged to receive data and an adaptive filter (adaptive notch filter (ANF) module 22 in figure 3) arranged to filter narrowband interference from the received data and provide filtered data (paragraph 0099).

It is desirable to have a front end arranged to receive data and an adaptive filter arranged to filter narrowband interference from the received data and provide filtered data because it provide benefit of eliminating jammers that emit signals falling within the bandwidth of the wideband signal (paragraph 0099). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Abdelmonem et al. in the receiver of Hoffman et al. and Ninomiya et al. to reduce interference and improve the integrity of the received wideband signal.

(2) Regarding claim 42 (the examiner interprets "the number of taps" as "a number of taps" and "the maximum number" as "a maximum number"):

Hoffman et al., Ninomiya et al. and Abdelmonem et al. disclose all subject matter as discussed in claim 41 except wherein a number of taps in the adaptive filter is greater than a maximum number of interferers to be cancelled.

Although Hoffman et al., Ninomiya et al. and Abdelmonem et al. do not specifically disclose wherein the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled, such limitation are merely a matter of design choice and would have been obvious in the receiver of Hoffman et al., Ninomiya et al. and Abdelmonem et al.. Hoffman et al., Ninomiya et al. and Abdelmonem et al. teaches using an adaptive notch filter to remove narrowband interference (paragraph 0099). The limitation of the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled does not define a patentably distinct invention over Hoffman et al., Ninomiya et al. and Abdelmonem et al., since both inventions as a whole are directed to using an adaptive filter to remove interference. Therefore, the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled would have been a matter of obvious design choice to one of ordinary skill in the art.

6. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (US 6,904,079 B2) in view of Abdelmonem et al. (US 2002/0173341 A1) and Ninomiya et al. (US 2001/0033625 A1) as applied to claim 41 above, and further in view of Takada (US 2002/0196876 A1).

Hoffman et al., Ninomiya et al. and Abdelmonem et al. disclose all subject matter as discussed in claim 41 except the adaptive filter uses a delayed stream of the received data as a reference signal.

However, Takada discloses an adaptive filter that uses a delayed stream of the received data as a reference signal (incoming signal $r(t)$ is being delayed but the delay device 41 as shown in figure 13, paragraph 0029).

It is desirable to use a delayed stream of the received data as a reference signal because it provides benefit of efficient interference removal in case an interference signal superimposed on a desired signal (paragraph 0118). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Takada in the receiver of Hoffman et al., Abdelmonem et al. and Ninomiya et al. to improve the efficiency of interference removal.

7. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (US 6,904,079 B2) in view of Abdelmonem et al. (US 2002/0173341 A1) and Ninomiya et al. (US 2001/0033625 A1) as applied to claim 41 above, and further in view of Roy (US 2004/0198452 A1) (the examiner interpret "the length of the delay in the delayed stream" as "a length of a delay in a delay stream"; and "the length of the pilot symbol" as "a length of the pilot symbol").

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Hoffman et al., Ninomiya et al. and Abdelmonem et al. disclose all subject matter as discussed in claim 41 except a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol.

However, Roy discloses an adaptive filter comprises a tapped-delay line having taps spaced by a symbol period (paragraph 0023), it is obvious to one of ordinary skill in the art that a symbol period would be longer than a pilot period.

It is desirable to have a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol because it can removal interference in the whole data symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Roy in the receiver of Hoffman et al., Abdelmonem et al. and Ninomiya et al. to improve the efficiency of interference removal.

8. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (US 6,904,079 B2) in view of Abdelmonem et al. (US 2002/0173341 A1) and Ninomiya et al. (US 2001/0033625 A1) as applied to claim 41 above, and further in view of Takahashi et al. (US 6,807,224 B1).

Hoffman et al., Ninomiya et al. and Abdelmonem et al. disclose all subject matter as discussed in claim 41 except further comprising a matched filter correlator.

However, Takahashi et al. discloses a receiver have sliding correlator and matched filter for standby mode and initial synchronous mode (abstract, matched filter 209 and sliding correlator 210 in figure 5, column 4, lines 39-44).

It is desirable to further comprising a matched filter correlator current consumption can be reduced by using the matched filter occasionally (column 2, lines 32-38). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Takahashi et al. in the receiver of Hoffman et al., Ninomiya et al. and Abdelmonem et al. to improve the power efficiency.

9. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelmonem et al. (US 2002/0173341 A1) in view of Yellin (US 2002/0094020 A1), Hoffmann et al. (US 6,904,079 B2).

(1) Regarding claim 30:

Abdelmonem et al. discloses method comprising the step of:

receiving a stream of received data (antenna 10 in figure 3 receives a stream of received data, paragraph 0050, lines 4-6),

the stream of received data through an adaptive filter that reduces interference from any narrowband interferer (the adaptive notched filter ANF 12 effectively eliminate jammers that emit signals falling within the bandwidth of the wideband signal, paragraph 0099, lines 1-10, the ANF module eliminates narrowband interference, paragraph 0045, lines 8-9),

a bypass switch 92 so that if no narrowband interference is detected in the input signal, the bypass switch 92 may be enabled to bypass the notch filter 86, thereby passing the input signal directly to the next component, paragraph 0111.

Abdelmonem et al. fails to disclose (a) passing the filtered data through a correlator arranged to detect pilot symbols wherein the pilot symbol includes one or more repetitions of known data or pseudo noise; and (b) when a pilot symbol is detected passing the stream of received data to a receiving apparatus without first passing the received data through the adaptive filter.

With respect to (a), Hoffmann et al. discloses a passing the filtered data through a correlator (access acquisition 60 in figure 3) arranged to detect pilot symbols (the access acquisition function 60 is seen to include a pilot correlation filter 70 as well as an integration function 72, column 5, lines 58-67) wherein the pilot symbol includes one or more repetitions of known data or pseudo noise (each pilot block 53 consists of a number of repeated pilot symbol, column 5, lines 7-8).

It is desirable to passing the filtered data through a correlator arranged to detect pilot symbols wherein the pilot symbol includes one or more repetitions of known data or pseudo noise because using repeat known data in the pilot enable the correlator can perform autocorrelation of the pilot for pilot detection and synchronization. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Hoffman et al. in the method of Abdelmonem et al. to improve the synchronization process.

With respect to (b), Yellin discloses when the pilot symbol is detected, a plurality of interference processor for generating an interference effect of the pilot of the different base stations (paragraph 0067-0068).

It is desirable to combine the teaching of Yellin of detection the interference when detecting pilot and when the interference is not present, using the teaching of Abdelmonem et al. to bypass an adaptive filter by controlling a bypass switch so as to reduce power consumption of the adaptive filter. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Yellin in the method of Abdelmonem et al. and Hoffmann et al. to reduce the power consumption of the method.

(2) Regarding claim 31 (the examiner interprets "the number of taps" as "a number of taps" and "the maximum number" as "a maximum number"):

Abdelmonem et al., Yellin and Hoffmann et al. disclose all subject matter as discussed in claim 41 except wherein a number of taps in the adaptive filter is greater than a maximum number of interferers to be cancelled.

Although Hoffman et al., Ninomiya et al. and Abdelmonem et al. do not specifically disclose wherein a number of taps in the adaptive filter is greater than a maximum number of interferers to be cancelled, such limitation are merely a matter of design choice and would have been obvious in the receiver of Abdelmonem et al., Yellin and Hoffmann et al.. Abdelmonem et al., Yellin and Hoffmann et al. teach using an adaptive notch filter to remove narrowband interference (paragraph 0099). The limitation of the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled does not define a patentably distinct invention over Abdelmonem et al., Yellin and Hoffmann et al., since both invention as a whole are directed to using an adaptive filter to remove interference. Therefore, the number of taps in the

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adaptive filter is greater than the maximum number of interferers to be cancelled would have been a matter of obvious design choice to one of ordinary skill in the art.

10. Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelmonem et al. (US 2002/0173341 A1) in view of Yellin (US 2002/0094020 A1), Hoffmann et al. (US 6,904,079 B2) as applied to claim 30 above, and further in view of Takada (US 2002/0196876 A1).

Abdelmonem et al., Yellin and Hoffmann et al. disclose all subject matter as discussed in claim 30 except the adaptive filter uses a delayed stream of the received data as a reference signal.

However, Takada discloses an adaptive filter that uses a delayed stream of the received data as a reference signal (incoming signal $r(t)$ is being delayed but the delay device 41 as shown in figure 13, paragraph 0029).

It is desirable to use a delayed stream of the received data as a reference signal because it provides benefit of efficient interference removal in case an interference signal superimposed on a desired signal (paragraph 0118). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Takada in the method of Abdelmonem et al., Yellin and Hoffmann et al. to improve the efficiency of interference removal.

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11. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abdelmonem et al. (US 2002/0173341 A1) in view of Yellin (US 2002/0094020 A1), Takada (US 2002/0196876 A1), Hoffmann et al. (US 6,904,079 B2) as applied to claim 32 above, and further in view of Roy (US 2004/0198452 A1) (the examiner interpret "the length of the delay in the delayed stream" as "a length of a delay in a delay stream"; and "the length of the pilot symbol" as "a length of the pilot symbol").

Abdelmonem et al., Yellin, Hoffmann et al., and Takada disclose all subject matter as discussed in claim 32 except a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol.

However, Roy discloses an adaptive filter comprises a tapped-delay line having taps spaced by a symbol period (paragraph 0023), it is obvious to one of ordinary skill in the art that a symbol period would be longer than a pilot period.

It is desirable to have a length of a delay in a delayed stream of the data is longer than a length of the pilot symbol because it can removal interference in the whole data symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to employ the teaching of Roy in the method of Abdelmonem et al., Yellin, Hoffmann et al., and Takada to improve the efficiency of interference removal.

Allowable Subject Matter

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12. Claim 34-36 and 45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Teller (US 6,590,833 B1) discloses an adaptive cross correlator.

Kim et al. (US 2004/0109670 A1) discloses a carrier recovery apparatus and method for high definition television receivers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SIU M. LEE whose telephone number is (571)270-1083. The examiner can normally be reached on Mon-Fri, 7:30-4:00 with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Siu M Lee/
Examiner, Art Unit 2611
5/21/2009

/Chieh M Fan/
Supervisory Patent Examiner, Art Unit 2611